Market Feedback, Investment Constraints, and Managerial Behavior

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Abstract

This paper examines the joint role of market feedback and investment constraints on managerial behavior. Using a sample of UK fixed price initial public offerings, we show that underperformance of share returns at the IPO significantly affects managerial investment decisions in the period after the offering. Firms with better investment opportunities and proportionately lower fixed (higher intangible) assets are more sensitive to negative market feedback. Over the longer term, the more responsive firms perform significantly better than their non-responsive counterparts. The findings contribute to the debate on the informational advantage of managers over investors and present strong evidence that the market, on aggregate, can provide a superior assessment of a firm's opportunities. Managers who are able to respond to negative market feedback can significantly improve their firm's future prospects.

1 Introduction

Many studies have focused on the importance of activist equity and debtholders and their influence on company decision making,[1] however, very few studies have considered the impact of market sentiment on company decision making.[2] Is a company's management aware of market sentiment, and if so, how does this affect their long-term business decisions? The aim of this paper is to provide a comprehensive answer to this question, which is of interest not only to researchers in corporate finance but also to investors and policy makers. Specifically, we examine the impact of market feedback on a number of firm level business decisions extending earlier work which examines the extent to which market feedback affects capital expenditures (Van Bommel and Vermaelen (2003)). Further, we examine the extent to which investment constraints impact upon the ability of managers to respond to feedback, a pivotal factor which has been overlooked in previous work. As we will see, such constraints determine the extent to which managers are able to adjust their plans in response to market feedback, which in turn has significant consequences for companies' long run performance.

The debate on the superiority of management information versus that of the market on aggregate has been led by Jensen and Meckling (1976), Myers and Majluf (1984) and Subrahmanyam and Titman (1999). Models of agency theory [Jensen and Meckling (1976) and Myers and Majluf (1984)] are built on the premise that managers are more informed than outside investors. However, Subrahmanyam and Titman (1999) argue that the market in aggregate may be better informed (about a firm's prospects) than management. As a result, stock prices provide information that is useful to firm insiders. Similarly, Rock (1986) argues that in an IPO, management (including their advisors) lack perfect information with regard to the true value of

[1] See for example Jensen (1986), Eckbo and Verma (1994), Kochhar and David (1996), Short, Zhang and Keasey (2002), and English, Smythe, and McNeil (2004).
[2] Maksimovic and Pichler (1999), Subrahmanyam and Titman (1999) and Van Bommel and Vermaelen (2003) are examples.

their firm, and whilst they may know more than any individual investor, they know less than all investors combined.

Initial public offerings are, in many ways, an ideal event to study the effect of market feedback on long-term business decisions. The IPO is clearly defined with no market events to precede it. This permits a direct and clean analysis of the sensitivity of managerial decision making to signals of aggregate market expectations and sentiment. On the date of listing, investors have, for the very first time, an opportunity to express their view on the value and prospects of an issuing firm. Consequently, managers, for the first time, can compare their own accounting-based valuation (of the firm's basket of projects) to that of the market and respond accordingly.

This paper makes a number of contributions to the literature. First, we extend earlier work[3] to examine the impact of market feedback on a number of firm level business decisions. To fully understand the dynamics of managerial decision making and its sensitivity to factors such as market feedback, it is important to consider several dimensions of managerial behavior. In this regard, we examine the joint sensitivity and endogeneity of investment and financing decisions.

Second, we are not aware of any prior papers which examine the impact of investment constraints on managers' ability to react to market sentiment and the implications of this for firm performance over the longer term and our paper addresses this gap in the literature.

Third, we develop comprehensive empirical proxies for market feedback and unexpected investment and financing decisions. Importantly, we directly record deviations from planned expenditures using information from prospectuses rather than implying deviations using econometric models. Although there are benefits to the latter approach, directly calculating the

[3] We refer to the work by Van Bommel and Vermaelen (2003) cited above.

difference in expenditure from official documents will result in a more accurate proxy for managerial sensitivity to market feedback. We also examine an alternative proxy for market feedback. Our approach centers on deviations of the market price from the issue price and we calculate feedback over the first month of listing so as to avoid any possible confounding effects of investor over-reaction at the IPO [see Loughran and Ritter (1995)].

Finally, the paper considers the effect of market feedback in an environment, the United Kingdom, outside of the United States. The UK is similar in many respects to that of the US with the exception that price support after share offerings is less endemic in the UK.[4] As a consequence, the results of our study are likely to be more robust than if they been undertaken on a sample of US IPOs, where any market feedback would be distorted by price support.

We find that firms with the most negative market feedback have significantly higher levels of scaled under-investment than other firms (there is no evidence of scaled over-investment for positive feedback firms). Investment opportunities and operational flexibility determine the extent to which managers can modify their investment strategy as a result of market feedback. Average under-investment among the most negative feedback firms is driven by firms with the greatest investment opportunities, where under-investment levels are over ten times more than firms with the most positive feedback. We find no evidence that under-investing firms increase their debt repayments or make higher dividend payments and suggest that funds raised for investment purposes are retained pending the modification of investment plans. Unsurprisingly, the poorest feedback firms which face the strongest investment constraints, do not reduce their planned investment and press ahead with their investment plans despite market opinion.

[4] Only a very small number of IPOs in our sample stipulated that the underwriter may over-allot shares or engage in other activities which may stabilize or maintain market prices.

Managerial reactions to market feedback have implications for long-run performance. Firms that respond to negative market feedback perform no worse than their positive feedback counterparts over the longer term. Specifically, firms that revise their investment plans in response to negative market feedback have risk adjusted share returns which are significantly lower in the first 12 months after the IPO, but subsequently recover to be similar to comparable positive feedback firms up to 24 and 36 months later. Firms that do not respond to market feedback at the IPO have risk adjusted returns that are significantly lower than comparable positive feedback firms at 12, 24 and 36 months post-IPO.

A related study to the present paper is Van Bommel and Vermaelen (2003), who examine capital expenditure decisions following IPOs. However, our analysis is different in several key ways. Most significantly, we consider the impact of investment constraints on managerial reactions to market feedback, and the consequences of a failure to anticipate these constraints on long run performance. We also extend our analysis to consider the wider impact of under-investment on the business decisions of the firm, thereby providing a more complete picture of the consequences of market feedback.

The remainder of the paper is as follows. Section Two provides an overview of the institutional environment in the UK. The sample description follows in Section Three. Section Four develops proxies for market feedback, unplanned capital expenditures and investment constraints. Section Five presents our empirical results and Section Six concludes the paper.

2 Institutional Background

In the UK, a pathfinder prospectus is issued about 6 weeks before admission of the firm to the market. Presentations to potential investors, which involve the issuing company's advisors and

representatives, take place about 4 weeks prior to the issue date of the full prospectus. Indications of interest are gathered at these presentations and together with market conditions, the issue price is determined.

All London Stock Exchange (LSE) listings must be sponsored by an LSE approved advisor and the sponsor will usually act as the lead underwriter. The two predominant methods of issuing shares are *Offers for Sale* and *Placings*. In an *Offer for Sale*, both institutional and private investors subscribe for an allocation of shares. A *Placing* involves the issue of shares to specific institutional investors, who have been selected by the issuing firm's sponsor or broker.[5]

Discriminatory pricing in an initial public offering is prohibited in the UK. When issues are oversubscribed, shares are allocated on a pro-rata basis. A constant proportion need not be applied across all applications when dealing with oversubscription since the LSE allows discrimination in the allocation of shares on the basis of the size of the application. However, the LSE does not usually allow discrimination in the allocation of shares on the basis of the identity of the applicant (Brennan and Franks (1997)). In all cases, the investment bank handling the issue must publish the basis on which shares are allocated.

3 Sample Description

The sample consists of all initial public offerings of equity on the London Stock Exchange (LSE) and the Alternative Investment Market (AIM)[6] over the period January 1991 to December 1998 for which prospectus and share price data are available. Introductions, investment trusts, and

[5] With reference to UK market terminology it should be noted that both 'offers for sale' and 'placings' are universally referred to as IPOs in the academic literature. Thus, for example, the samples of UK IPOs employed by Levis (1995), Rees (1997) and Espenlaub et al. (2000) include both offers for sale and placings. 'Placings' involve an initial listing of the firm's shares on an exchange and can thus be differentiated from 'private placements' which are not IPOs.

[6] We include 7 listings on the forerunner of the AIM market, the Unlisted Securities Market. This closed to new entrants on 31.12.1994, and the AIM opened on 19.06.1995.

privatisation IPOs are excluded from the sample because they are unlike conventional corporate offerings and would misrepresent the underlying results.

We focus on firms that declare the amount to be spent on investment at the initial public offering. There were 224 of such IPOs,[7] of which 39, primarily from the financial sector, are omitted, owing to a lack of appropriate accounting data.[8] This leaves a final sample of 185 initial public offerings. Table One presents statistics on the uses to which the funds raised at the IPO were employed.

Insert Table 1 about here

For the purposes of the analysis undertaken in Table One, investment has been divided into two categories, *specific* and *general*. If an issuing firm has given details of the investment to which funds will be put, this is classified as specific investment. Just over 27% of raised funds are applied to specific investment projects that are detailed in the IPO prospectus. General investment relates to the company's stated intention to apply the funds to investment, but no further details have been given; 34% of funds are allocated in this way.

Table One shows that the repayment of liabilities is the other predominant reason for which funds are raised at the IPO, with 25% of all monies devoted to this purpose. The remaining 14% of funds are applied to working capital, marketing, or placed on deposit.

[7] There were a total of 652 domestic IPOs to the London Markets from 1991 through 1998 denominated in GBP, net of introductions, investment trusts and sales by the Secretary of State (privatisations). Prospectus and share price data is available for 502 of these IPO companies, of which 224 IPOs state an intention to apply proceeds raised at the IPO to investment. A chi squared test confirms that the sample of 502 IPOs for which data is available does not significantly differ in industrial composition from the 652 IPOs which constitute the population. The industrial sectors employed for the purpose of the chi-squared test are Resources, Industrials, Consumer Goods, Services, Utilities and Financials. Information Technology subsequently became a separate sector but these companies were included in Services at 1998.

[8] 4 of these 39 companies were not from the financial sector. Firms must survive for a minimum of 365 days to ensure that post-IPO spending is recorded.

There is considerable variation in the uses to which funds are utilized over the sample period. Working capital is cited as a 'use of funds' in 18.86% of all IPOs in 1994 yet only 2.69% the following year. However, whereas there is some volatility in the use of funds for general and specific investment, the aggregate figure is fairly consistent, ranging between 40% and 60%.

4 Description of Proxies

The empirical proxies represent three major aspects of the analysis. One, we model the level of market feedback at the initial public offering. Two, we develop a representation of the degree of unplanned capital expenditure subsequent to the issue and three, we identify an appropriate proxy for investment constraints (opportunities).

4.1 Market feedback at the initial public offering

If the market feedback hypothesis is valid, managers assess information contained in post-IPO market returns to determine future investment policy - which may therefore be different to that contained in the IPO prospectus. Since the issue price is published alongside investment plans in the prospectus, it can be assumed that a fully subscribed IPO will raise sufficient cash to cover a firm's published investment plans.

Our proxy for market feedback is the abnormal return over the first month of listing. We also report results where abnormal underpricing, the adjusted difference between the issue price and first day trading price, is employed as the market feedback proxy.[9] When a company has a positive abnormal return this indicates that market feedback was positive, whereas negative abnormal returns indicate poor feedback.

[9] Neither of these two measures affect the proceeds raised at the IPO. This is important since higher proceeds would have allowed more scope for capital investment.

The monthly abnormal return is given by the 20-day cumulative stock return less the contemporaneous cumulative return on the Financial Times Actuaries (FTSE) All Share index.[10] Returns are measured from the issue price and cumulation occurs at the listing date of the IPO, and thereafter on a weekly basis.

The four week excess return is our preferred proxy for market feedback for two reasons. First, if managers are presumed to act on market feedback, it is important to establish that feedback is received by managers in the form we employ as a proxy. A comparison of an IPO firm's performance against the market index is likely to occur in all offerings. The determination of abnormal underpricing, on the other hand, requires the use of an econometric model, and whilst the factors we employ to determine abnormal underpricing are all reasonable (see below), there is a limited likelihood that the managers of each IPO will employ a similar model to determine the extent of market feedback.

The second reason for preferring a longer term proxy such as the four-week post-issue excess return, rather than IPO underpricing, is that managers are more likely to gauge feedback over the first month of listing rather than the first day of listing, given concerns of investor over-exuberance at IPOs [Loughran and Ritter (1995)].

Our second feedback measure is abnormal IPO underpricing. Although there are a number of competing theories,[11] a consensus has not been reached on what determines the level of underpricing. As a result, the issue is largely an empirical one. Considerable empirical evidence exists to suggest that IPO underpricing might be affected by the method of issue [Levis (1993)],

[10] Use of sector (FT Actuaries) indices in place of the All Share index did not materially affect reported abnormal returns.
[11] For summaries, see Ibbotson, Sindelar and Ritter (1988), Tinic (1988), Shiller (1989), Saunders (1990), Jenkinson and Ljungqvist (1996), Noland and Pavlik (1998), and Loughran and Ritter (2004).

the sponsor to the issue [Carter and Manaster (1990), Loughran and Ritter (2004)], the reporting accountant [Beatty (1989) and Hogan (1997)], the amount of equity sold/retained at the IPO [Jog and McConomy (2003), Downes and Heinkel (1982), Clarkson, Dontoh, Richardson and Sefcik (1992)], and market movements immediately prior to the issue [Rees and Byrne (1994), Loughran and Ritter (2002) and Hill and Wilson (2006)].

The method of issue (METHDUM), the sponsor to the issue (SPONSOR), the reporting accountant (ACCDUM), and movements on the sector index immediately prior to the setting of the issue price (MMNTM), are included as variables in a parsimonious model employed to determine expected IPO underpricing. This model is shown in Equation 1 below.

$$R_i - R_m = \alpha + \beta_1 Methdum + \beta_2 Sponsor + \beta_3 Accdum + \beta_4 Mmntm + \varepsilon \qquad (1)$$

where $R_i - R_m$ is the natural logarithm of one plus the issue date return of the issuing firm *less* the issue date return on the FTSE All Share index; *Methdum* is a dummy variable that takes a value of 1 for issues via the placing method, and 0 otherwise; *Sponsor* is the natural logarithm of the market share of the sponsor;[12] *Accdum* is a dummy variable that takes a value of 1 where the reporting accountant is a *Big 6* accountant, and 0 otherwise;[13] and *Mmntm* is the return on the FT Actuaries (FTA) sector index for a period of 2 weeks prior to the date of the prospectus. Test statistics are generated using White's (1980) heteroscedasticity consistent estimates of the true standard errors since the null hypothesis of homoscedastic variances was rejected in preliminary testing.

[12] The market share is given by the percentage of total IPO funds across the UK market handled by the sponsor during the sample period.
[13] The *Big 6* firms are KPMG, Coopers and Lybrand, Ernst and Young, Price Waterhouse/Price Waterhouse Coopers, Touche Ross/Deloitte Touche, and Arthur Andersen.

Insert Table 2 about here

From Table Two, it can be seen that placings lead to a significantly greater level of underpricing than offers for sale. This can be explained by the theories of Booth and Smith (1986) and Shiller (1989), where sponsors (underwriters) are keen to offer IPO shares to favored clients at a discount to earn reputation capital, which will lead to increased profits over the longer term. The reputations of the sponsor (as proxied by market share) and the reporting accountant, are, as expected, negatively related to the degree of underpricing. Empirical support for the relationship between underpricing and sponsor reputation is provided by Carter and Manaster (1990) and Michaely and Shaw (1994), and between underpricing and high quality auditors by Beatty (1989) and Hogan (1997).

Finally, pre-issue price momentum is shown to be significantly related to underpricing at the issue date. Empirical support is provided by Hanley (1993), Rees and Byrne (1994), and Benveniste, Ljunqvist, Wilhelm and Yu (2001). Ibbotson and Jaffe (1975) suggest that issuers and their advisors fail to adequately gauge the pace of the market and consequently leave a significant shortfall between the issue price and market valuation.

4.2 Post-IPO unplanned capital expenditures

To determine the impact of market feedback on long term capital expenditures, we subtract the expenditure plans as declared at the IPO from the observed investment levels over a one-year period subsequent to the listing. This difference is then divided by the total value of the firm's fixed assets on the issue date so as to standardise the expenditure levels across firms.[14]

[14] Implicitly, we are assuming that the cash raised at the IPO would be invested within a year of the issue date. Table Three at the end of this section provides empirical support for this assumption.

Investment plans are taken directly from the IPO prospectus whereas the actual level of investment is taken from pre- and post-listing accounts. To estimate the post-IPO capital expenditures, we add the net change in the book-value of fixed assets over the year to the depreciation charge for the year.

Accounting information is only available on an annual basis, however many IPO firms prepare accounts for a smaller period to include in their prospectus, and we employ this information where available. If the first set of accounts filed after the IPO covers a post-IPO period of less than three months (ninety days), an investment period of one year is assumed to be commensurate with the year covered by the second set of post-listing accounts. In all other cases, a pro rata allocation of accounting data is undertaken.

Table Three presents the average planned and observed capital expenditures for the firms in our sample over the one-year period post-IPO. Of the £5,775,884 raised at the IPO for investment purposes, on average, £186,278 (3.2%) had not been spent one year after the IPO. Thus, investment plans set out in the prospectus appear to come to fruition over a reasonably short time period following the IPO.

Insert Table 3 about here

4.3 Investment Constraints

Investment opportunities and flexibility can influence the impact of market feedback on managerial behavior. A firm that faces numerous investment opportunities and has fewer fixed assets in place has more scope to revise initial investment plans. Conversely, firms that are investment-constrained will find it more difficult to modify pre-planned investment policies. Book to market value is a suitable proxy for investment constraints. However, given that 16% of

the sample has a negative net worth, we employ the proxy of tangible fixed assets to market value, which, henceforth, we refer to as the book to market value.

5 Empirical Results

5.1 Introduction

In Section 5.2 we undertake a preliminary analysis of the relationship between market feedback and capital expenditure. In Section 5.3 we incorporate the role of investment constraints in the market feedback - capital expenditure analysis. In Section 5.4 we investigate whether changes to investment plans as a consequence of market feedback have any impact on debt repayment and dividends. In Section 5.5 we compare the longer term performance of those firms which revised investment plans in response to market feedback with those which didn't.

As a first step, we present variations in the expected proportion of IPO funds to be applied to different uses (i.e. repay debt, investment, working capital, marketing, on deposit) conditional on market feedback (quintile portfolios) and investment constraints (high versus low book to market firms). For the purpose of this analysis, we employ our preferred measure of market feedback: the 4 week return. Table Four compares the average percentage of total proceeds to be spent on each purpose for negative feedback firms (Quintile 1) and positive feedback firms (Quintiles 2 to 5) across both low and high book to market values.

Insert Table 4 about here

Low book to market firms expect to spend a significantly lower proportion of IPO funds on the repayment of liabilities than high book to market firms, but a significantly higher proportion on marketing. There is some evidence to suggest that Quintile 1 high book to market firms intend to

utilize a greater proportion of funds on marketing than other high book to market firms. Otherwise there is no difference in the expected use of funds across market feedback or investment constraint samples.

5.2 Impact of market feedback on capital expenditures

Table Five presents firm capital expenditure conditional on market feedback for our two different feedback proxies. Panels A (market feedback as proxied by the 4 week excess return) and B (market feedback as proxied by abnormal underpricing) confirm that scaled abnormal capital expenditure increases with market feedback. The *F* statistic from a one-way ANOVA and the chi-squared statistic from the non-parametric Kruskal-Wallis test confirm that scaled abnormal capital expenditure is not equal across market feedback groups. The findings, especially those from Panel A, provide support for our core hypothesis of a positive relationship between market feedback and business investment activity.

Insert Table 5 about here

Firms with the most negative feedback at the IPO have significantly lower levels of scaled abnormal capital expenditure. Strikingly, Panel C of Table Five shows that firms with the most negative feedback (Quintile 1) have a level of scaled abnormal investment ten times lower than the rest of the sample (Quintiles 2 to 5). The significance of this finding is confirmed via both a *t*-test and a Mann-Whitney U test.

When manager and market opinion rationally coincide, the expected number of firms under- or over-investing would be the same - a non-informative and unbiased prior. If managers believe

market feedback, abnormally positive returns subsequent to an IPO may lead to overinvestment while negative returns may lead to underinvestment. We examine the number of firms that under-invest across each feedback quintile and find that the percentage of firms under-investing across the first quintile is significantly higher, approximately 70%, than the average number of firms under-investing across other quintiles, which stands at around 50%.[15] A chi-squared test confirms that this difference is significant at the 5% level. Thus, within Quintile 1, 30% of firms decide to go ahead with what the market potentially deems to be unwise investment, whilst 70% of IPO firms do not undertake their planned level of investment.

This analysis can be compared to that of Van Bommel and Vermaelen (2003) and highlights important differences between the US and UK. In the US, the most positive feedback leads to significant overinvestment by IPO firms whereas our study provides a mirror-image result with significant underinvestment for the most negative market feedback firms but no overinvestment for positive feedback. The assumption that positive feedback leads to greater investment in a firm's basket of projects relies on those projects having scope for further investment. However what isn't in doubt is that managers can choose to scale back investment on receipt of negative feedback.

5.3 The impact of investment constraints on managerial reactions to market feedback.

To investigate the impact of market feedback upon capital expenditures after controlling for investment constraints, we divide our sample into high book to market (i.e. firms with fewer investment opportunities and a higher proportion of fixed assets in place) and low book to market initial public offerings. In Panel A of Table Six, it can be seen that the characteristics (mean

[15] The proportion of firms under-investing across Quintiles 2 to 5 has a maximum of 51% (Q2 and Q4) and a minimum of 49% (Q3).

planned investment, size of the company, market feedback distribution) of firms do not differ significantly between groupings sorted on book to market ratio.

Insert Table 6 about here

Abnormal capital expenditure is then calculated separately for both high and low book to market firms within each feedback quintile.[16] Results are presented in Panel B of Table Six. The *F* statistic from a one-way ANOVA and the chi-squared statistic from the non-parametric Kruskal-Wallis test confirm that market feedback affects the level of under-investment for firms which face lesser investment constraints (low book to market values), but not for firms which face greater constraints (high book to market values).

Low book to market firms with the poorest feedback at the IPO (Quintile 1) have a level of scaled abnormal capital expenditure over 10 times lower than that of low book to market firms with the most positive feedback (Quintile 5). Furthermore, mean scaled abnormal capital expenditure is significantly negative (representing underinvestment) for the poorest feedback firms (Quintiles 1 and 2) with low book to market values.

5.4 Redirection of Investment Funds

In Section 5.3 it was reported that poor market feedback and the existence of greater investment opportunities contribute to firm underinvestment after an initial public offering. This may suggest that under-investing firms retain a proportion of their IPO funds pending a revision of the original investment plans. However, proceeds not utilized for investment purposes might equally be

[16] The number of high and low market to book firms will vary across quintiles since we define a company as being either high or low book to market by reference to the full sample of companies rather than by reference to other companies within a particular quintile.

redirected to restructure the financing of the firm. In this section we analyze the extent to which this is true, specifically whether the retained funds are used to pay off debt or pay out dividends.

To obtain the "abnormal" amount of repaid debt, we subtract the amount of IPO proceeds scheduled for debt repayment in the IPO prospectus[17] from the actual net repaid debt. Actual net repaid debt is given by the change in the amount of outstanding debt from the date of the IPO to the end of the period of the first post IPO accounts. To this we add the amount of loans issued for cash and acquisitions *less* loans redeemed in the second accounting period following the IPO.[18] As with abnormal capital expenditure this amount is scaled by the size of the IPO firm and, to be consistent with the scaling of capital expenditure, we employ the size of the tangible fixed assets at the date of the IPO for this purpose.

To determine whether firms redistribute under-invested funds to shareholders in the form of dividends, we examine dividend policy with respect to other firms in the same industrial sector. This is done by standardizing the average payout ratio of each firm over the two years post-IPO by the industrial sector payout ratio over the same period.[19]

We address three questions. First, does under-investment lead to the redirection of funds to debt and dividend payments? Second, do investment constrained firms that under-invest make larger repayments of debt and dividends? Third, does market feedback affect excess debt repayments or dividends after allowing for the impact of market feedback on investment?

[17] For this purpose we separate amounts committed to *debt* repayment from the amounts committed to the "repayment of liabilities" as shown in Table One.

[18] The slightly longer period over which we examine debt repayment and dividend payments allows for a possible lag between the decision to review investment plans and the decision to redirect funds to debt or dividend payments.

[19] The dividend payout ratios for each industrial sector across the sample are as follows: Resources 5.5%; Industrials 27.8%; Consumer Goods 14.5%, Services 22.3%; Utilities 0%; Information Technology 12.5%. Only one sample company belonged to the Utilities sector. Only one of our sample firms undertook a share repurchase within 2 years of the IPO. This company announced a share repurchase 379 days post the IPO.

We divide our sample into under- and over-investing firms and then sub-divide again into high and low book to market firms, and further into negative feedback (Q1) and positive feedback (Q2 to Q5) firms. We report scaled abnormal debt repayments and relative dividend payments across each sub-group. On average, scaled abnormal debt repayments would be expected to be zero, and on average, dividend relatives would be expected to be one. We test the mean and median across each sub-group against these expected values.

Insert Table 7 about here

Table 7 suggests that positive feedback firms (Q2 to Q5) which under-invest make excess repayments of debt. These are significantly non-zero and positive. However negative feedback (Q1) firms that under-invest do not make payments of debt which differ significantly from zero. The mean value of 3.20 for under-investing low book to market Q1 firms is caused by one firm making substantial scaled debt overpayments. Across the sub-samples that over-invested, on average, scaled debt overpayments did not differ significantly from zero.

Turning to dividends, we find that under-investing low book to market negative feedback (Q1) firms had dividend relatives which were significantly below one, whereas over-investing high book to market positive feedback (Q2-5) firms had dividend relatives which were significantly greater than one. Across all other sub-groups the dividend relative wasn't significantly different from one.

In summary, we find no evidence that negative feedback firms with low book to market values redirected a larger amount of under-invested IPO proceeds to debt repayment. Nor do we find that these firms return any under-invested IPO proceeds to investors by paying a higher rate of

dividend than the sector norm. The results are therefore indicative of uninvested IPO proceeds being held on deposit pending the modification of existing investment plans.[20]

5.5 Long term analysis

In an efficient market, long-run performance expectations related to IPO quality should be reflected in a one-off adjustment to the price at the IPO, after which all firms should provide the appropriate risk adjusted return (see, for example, Brav and Gompers (1997) who make a similar argument in respect of the comparative performance of venture backed firms and non-venture backed firms). Where the market has provided sufficient negative feedback to prevent unwise investment subsequent to the IPO, we would expect to see no difference in the long run risk adjusted returns of the poorest feedback firms and the rest of the sample.

In Section 5.3, we reported that it is those firms which face greater investment opportunities and flexibility that tend to under-invest (relative to their size), whereas investment constrained firms make no significant adjustment to their capital spending. In this section we compare the longer term share price performance and longer term access to capital markets of positive (Q2 to Q5) and negative (Q1) feedback firms under differing investment constraints. Specifically we divide our sample into low and high book to market firms and compare their performance across different degrees of feedback.

We utilize a number of models to estimate the long run abnormal share price performance of IPO firms. Our first approach follows Loughran and Ritter (1995) and Stehle, Ehrhardt and

[20] We acknowledge that funds might also be redirected to current operating expenses, however the redirection of funds away from planned investment to operating expenses would be equally likely to apply to high book to market firms and since we find no evidence of underinvestment by these firms we consider this a less likely explanation. Where funds are redirected to current operating expenses the firm may destroy value, since it must be assumed that the company had budgeted elsewhere for these expenses and thus expenses are larger than anticipated.

Przyborowsky (2000) and compares the observed return on IPO firms to a control firm, matched by market capitalization at the beginning of the first calendar year post-issue.[21] The second approach we consider is the market adjusted model [see Ritter (1991), Levis (1993), Brav and Gompers (1997), and Stehle et al. (2000)], where the return on the market (FTSE All Share index) is subtracted from the observed return on the IPO firm. Our third approach allows for sector wide influences. In this method, the return on the sector index is subtracted from the return on the IPO firm. Our fourth approach follows Espenlaub et al. (2000) and employs a multi-index model, as set out at Equation 2 below, to forecast expected returns.

$$E(R_{it}) = \alpha + \beta_1(R_{mt} - R_{ft}) + \beta_2(R_{ht} - R_{ft}) \qquad (2)$$

where, R_{it} is the return on share i for period t; R_{ft} is the 90-day treasury bill return for period t; R_{mt} is the return on the market portfolio (FTSE All Share index) for period t; and R_{ht} is the return on the Hoare Govett Smaller Companies index for period t.[22]

The cumulative abnormal return (CAR) on stock i at T months post-flotation is defined as the sum of the monthly abnormal returns to T months after the IPO date. Following Barber and Lyon (1997), if a company delists within 36 months of the IPO, it is assumed that an investor earns the benchmark (expected) return in subsequent periods.

[21] IPO companies are smaller than many listed companies and we found that matching by both industrial sector and size forced us into selecting matched companies which deviated considerably in size from the IPO company, and we therefore prefer to match by size only. To mitigate the consequences of this we report industry adjusted returns and we undertake a chi squared test of the distribution across industrial sector of the two sub-groups, "Quintile 1" and "Quintiles 2 to 5" which confirms that the industrial composition of the two sub-samples does not significantly differ.

[22] Robustness checks are undertaken by also calculating long run abnormal returns with respect to the Hoare Govett Smaller Companies index and the CAPM model. The results are consistent with the main models and are not reported.

Table Eight compares the long-run average cumulative abnormal returns of firms with negative feedback versus those with positive feedback for one, two, and three years respectively for low book to market firms (Panel A) and high book to market firms (Panel B).

Insert Table 8 about here

During the sample period, IPOs led to positive long run abnormal returns for most firms. This contrasts with the findings of Espenlaub et al (2000) and Levis (1993) who report negative long run share price performance of UK IPO firms. A possible explanation could be the different sample periods. The period from which the IPOs are drawn for this paper contains many IPOs from new sectors such as information technology, computer software and biotechnology, many of which would have been expected to outperform a benchmark made up of seasoned shares, which contain few of these new technology companies. The earlier periods of 1985 to 1992 [Espenlaub et al. (2000)] and 1980 to 1990 [Levis (1993)] would contain very few of these new technology stocks.

Over a one-year period, all IPOs with negative feedback perform significantly worse than other IPOs. However, over a two and three year period the performance of negative feedback *low* book to market firms is in marked contrast to that of negative feedback *high* book to market firms. The performance of low book to market, negative feedback firms recovers such that returns over two and three years are not significantly different from those of positive feedback firms. We suggest that the investment opportunities enjoyed by these firms allow them to suitably modify their plans to take account of market feedback.

By contrast, high book to market, negative feedback firms pressed ahead with their investment plans against market opinion and have extremely poor performance in comparison to positive

feedback firms, which extends over the three-year test period. These companies face investment constraints which would appear to have prevented them from fully responding to market feedback, leaving them exposed to investment in negative NPV projects.

In Table Nine, the results from a two-way analysis of cumulative capital raising in the three years post-IPO are presented. We compare capital raising across low and high book to market firms and across negative (Q1) and positive feedback firms (Q2 to Q5). Capital is defined as the net (of repayments) total amount of equity, debt and preference share capital raised, as a percentage of IPO proceeds. Amounts for each year are cumulative. Firms which do not survive for the full year are omitted from the analysis for that year.

Insert Table 9 about here

By Year Three we see a significant difference in capital raising between high and low book to market firms with negative feedback. There is also a similar difference between high book to market firms with positive and negative feedback. This mirrors the abject share return performance of investment-constrained, negative-feedback shares. Having failed to take account of market feedback at the IPO, these companies fail to gain continued access to capital markets.

6 Conclusions

Initial public offerings are periods of uncertainty for investors and managers alike. Share returns at the IPO contain information about the market's assessment of the marginal return on the firm's planned projects. Our results suggest that investment constraints have a significant effect on how managers employ market feedback to adjust pre-planned investment policies.

Long run post-IPO performance is also affected by market feedback at the announcement. Over a one-year period companies with the most negative market feedback experience significantly worse share price performance consistent with either unwise or underinvestment. However the persistence of poor performance is dependent on whether managers are able and willing to respond to negative market feedback. We find that negative feedback companies which revise their investment plans have a share price performance over 2 and 3 years which is not significantly different from positive feedback IPOs. Firms that fail to respond to negative market feedback continue to significantly under-perform other companies.

These results have important implications for investors, managers and policy makers. Companies facing limited opportunities to revise their investment plans subsequent to an offering should have their investment plans subjected to greater scrutiny prior to listing[23] and in some cases have a more discounted offer price. As a result of inadequate pricing or screening, investors in these firms made considerable abnormal losses for up to three years post-listing.

In addition to presenting findings relevant to the UK IPO vetting process, this paper provides further empirical evidence on the relationship between stock prices and managers' behavior. Although this remains an under-researched area, there is growing empirical evidence to support the theoretical contention that stock prices convey valuable information to managers. Market feedback does appear to influence managerial behavior even when detailed business plans have been developed and marketed to investors, as in an IPO.

[23] Dittmann, Maug and Kemper (2004) analyse the relationship between valuation techniques employed by German venture capitalists and investment performance. Ritter (2003) argues that "very little academic research has focused on valuation issues" (page 429) and further analysis of the valuation techniques employed by UK IPO advisors, and the relationship between valuation techniques and longer term performance, is a possible avenue for future research.

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Table 1
Descriptive Statistics on the Use of IPO Proceeds

This table presents information on the application of proceeds for a sample of 185 UK initial public offerings over the period January 1991 to December 1998. 'Repayment of liabilities' relates to the repayment of debt, preference shares, repurchase of equity capital, any deferred consideration due to equity shareholders and payments of any expenses or dividends outstanding. 'Specific investment projects' refer to investment that was specified in the IPO prospectus. Funds are allocated to 'General Investment' when the issuing firm allocated funds to the purpose of 'investment' but details of the investment were not given in the IPO prospectus. The final category of 'On deposit/not specified' includes those funds that were allocated to 'general corporate purposes' in the prospectus.

	Totals	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
	£'000	**£'000**	**£'000**	**£'000**	**£'000**	**£'000**	**£'000**	**£'000**	**£'000**
IPO proceeds	1,733,969	12,975	79,816	172,243	248,791	299,935	398,102	339,831	182,277
N	185	2	6	14	27	16	52	48	20
% of which applied to[1]:	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Repayment of liabilities	24.73	34.48	28.13	37.29	20.55	34.34	15.37	27.29	16.20
Specific inv. projects	27.20	51.64	15.28	22.78	16.33	18.88	44.40	24.32	31.14
General investment	34.43	13.68	55.26	22.47	39.98	42.57	26.33	34.19	34.95
Working capital	9.94	0.00	1.33	13.79	18.86	2.69	10.89	10.18	8.25
Marketing	2.12	0.00	0.00	3.00	4.15	0.00	2.72	2.17	1.67
On deposit/not specified	1.59	0.00	0.00	0.66	0.32	1.33	0.30	1.85	7.79

Notes
1. The percentages in Table 1 represent the percentages spent on each purpose after aggregation and vary from the percentages presented in Table 4, in which percentages spent on each purpose are calculated for each firm and then averaged.

Table 2
Regression of Abnormal Underpricing against Issue Variables

This table presents the coefficients from an Ordinary Least Squares regression:

$$R_i - R_m = \alpha + \beta_1 METHDUM_i + \beta_2 SPONSOR_i + \beta_3 ACCDUM_i + \beta_4 MMNTUM_i + \varepsilon_i$$

where $(R_i - R_m)$ is the natural logarithm of one plus the issue date return of the issuing firm *less* the issue date return on the FTSE All Share index; *METHDUM* is a dummy variable that takes a value of 1 for issues via the placing method, and 0 otherwise; *SPONSOR* is the natural logarithm of the market share of the sponsor, which is given by the percentage of total IPO funds across the UK market handled by the sponsor during the sample period; *ACCDUM* is a dummy variable that takes a value of 1 where the reporting accountant is a *Big 6* accountant, and 0 otherwise. The *Big 6* firms are KPMG, Coopers and Lybrand, Ernst and Young, Price Waterhouse/Price Waterhouse Coopers, Touche Ross/Deloitte Touche, and Arthur Andersen; *MMNTUM* is the return on the FTA sector index for a period of 2 weeks prior to the date of the prospectus. Test statistics are generated using White's (1980) heteroscedasticity consistent estimates of the true standard errors since the null hypothesis of homoscedastic variances was rejected in preliminary testing.

	Coefficient	*t*-stat.	*p*-value
Constant	0.065	2.391	0.019
METHOD	0.099	3.851	0.000
SPONSOR	-0.004	-2.305	0.003
ACCDUM	-0.046	-2.150	0.022
MOMNTUM	0.793	3.003	0.032
N	185		
Adj R^2	10.80%		
Breusch Pagan χ^2	11.951		

Table 3
A Comparison of Planned versus Actual Expenditure

This table presents details of the planned capital expenditures of firms as taken directly from the IPO prospectuses as well as the actual capital expenditure of the full year subsequent to the IPO. Excess capital expenditure is calculated as the difference between planned and actual capital expenditure. Scaled excess expenditure is calculated by dividing the average excess capital expenditure measure by the average fixed assets at the IPO, as shown in this table. Averages are based on 185 IPOs over the period January 1991 to December 1998.

Data	Amount
Average planned investment	£5,775,884
Average actual investment	£5,589,606
Excess capital expenditure	-£186,278
Average fixed assets at the IPO	£6,636,261
Scaled excess capital expenditure using the above averages	-0.028

Table 4
Variations in the use of proceeds by market feedback and investment constraints

The sample is divided into lesser (greater) investment constraints by reference to their book to market values, with lower book to market values indicating lower investment constraints. A low (high) book to market value is one below (above) the sample median value. Firms are further subdivided into market feedback quintiles based on their IPO returns. Firms in Quintile 1 had negative IPO returns. Firms in Quintiles 2 to 5 had positive IPO returns. The percentage to be spent on each purpose as set out in the IPO prospectus is first calculated for each firm and this figure is averaged. These percentages therefore differ from those shown in Table 1 in which funds applied to each purpose are firstly aggregated across all firms and the percentages reflect these aggregate figures divided by total funds raised across all firms.

	N	Repay liabilities	Investment	Working Capital	Marketing	On deposit
High Book to Market Firms						
Q1 (Poorest feedback)	18	21.27%	54.02%	16.55%	5.65%#	2.51%#
Q2 to Q5	74	26.37%	60.17%	12.60%	0.84%#	0.02%#
Total High B/M	92	25.37%*	58.97%	13.38%	1.78%*	0.51%
Low Book to Market Firms						
Q1	19	10.25%	66.85%	11.63%	11.27%	0.00%
Q2 to Q5	74	11.77%	60.83%	17.21%	8.09%	2.11%
Total Low B/M	93	11.46%*	62.06%	16.07%	8.74%*	1.68%

Quintile 1 firms differ from Quintile 2 to 5 in the average proportions allocated to this purpose at a 5% level or above employing a non-parametric test. This result is not confirmed by a parametric test

* High book to market firms differ from low book to market firms in the average proportions allocated to this purpose at a 5% level or above employing both parametric and non-parametric tests

Table 5
Capital Expenditures Following Initial Public Offerings Across Market Feedback Quintiles

Scaled abnormal capital expenditures are calculated by subtracting the expenditure plans as declared at the IPO from the observed capital expenditures over a one-year period subsequent to an IPO listing. In order to standardise the expenditure levels, the difference is divided by the total value of the firm's fixed assets on the issue date. In Panel A, excess returns are calculated as the 4-week, post-IPO compound return. In Panel B, excess returns are abnormal underpricing, calculated using the estimated model in Table 2. The *F* statistic from a one-way ANOVA and the chi squared statistic from the non-parametric Kruskal-Wallis test confirm that scaled abnormal capital expenditure is not equal across market feedback groups. Panel C compares scaled abnormal capital expenditure for the poorest feedback firms with the rest of the sample.

Panel A: Scaled capital expenditure averages for quintiles ordered by compound returns at 4 weeks post-IPO.

Quintile	N	Week 4 excess return	Mean (Median) Scaled Abnormal Capital Expenditure
1	37	-10.07%	-12.31 (-1.346)
2	37	3.37%	-1.56 (-0.102)
3	37	10.96%	-1.77 (0.034)
4	37	19.96%	-1.54 (-0.049)
5	36[1]	48.41%	-0.87 (0.141)

Panel B: Scaled Capital Expenditure averages for quintiles ordered by abnormal underpricing.

Quintile	N	Abnormal Underpricing	Mean (Median) Scaled Abnormal Capital Expenditure
1	37	-13.06%	-12.82 (-1.828)
2	37	-6.34%	-1.19 (-0.125)
3	37	-2.31%	-0.49 (0.052)
4	37	4.18%	0.88 (-0.049)
5	36[1]	21.51%	-4.11 (-0.205)

Panel C: Scaled capital expenditure averages for Quintile 1 versus the rest of the sample.

	N	Wk. 4 excess return	Scaled Abnormal CAPEX	Abnormal Underpricing	Scaled Abnormal CAPEX
Quintile 1	37	-10.07%	-12.31	-13.06%	-12.82
Quintiles 2 to 5	147[2]	20.49%	-1.34	4.15%	-1.21
t stat			-1.816*		-1.889*
Mann Whit. *z* stat			-2.813**		-2.944**

** Significant at 1% and *5% level, employing a one tailed test.

Notes

1 One observation was omitted as an outlier, with scaled excess capital expenditure of 1173.57. The mean and standard deviation of scaled capital expenditure including this observation are 30.87 and 193.50 for compound returns at Week 4 and 27.71 and 193.89 for abnormal underpricing.

2. The outlier referred to at Note 1 above is omitted.

Table 6
Capital Expenditures and Investment Constraints

The sample is divided into high and low book to market firms by reference to the sample median value.

As an introduction to Panel B, Panel A compares the characteristics of high and low book to market firms. χ^2 tests of the difference in proportions and *t*-tests of the difference in means confirm that there are no significant differences in the characteristics of high and low book to market firms (we employ a 5% significance level).

In Panel B, scaled abnormal capital expenditure (CAPEX) is calculated as in Table 5. CAPEX is compared across market feedback quintiles for high and low book to market firms separately. The *F* statistic from a one-way ANOVA and the chi squared statistic from the non-parametric Kruskal-Wallis test confirm that CAPEX is not equal across market feedback groups for low book to market firms but this is not however the case for high book to market firms.

Panel A: Characteristics of High and Low Book to Market Firms

	Mean Planned Investment £'000	Mean Market Cap. £'000	2nd market[1] listings %	Market Feedback Distribution Q1	Q2	Q3	Q4	Q5
High B/M	6,352	47,418	36%	20%	27%	21%	17%	15%
Low B/M	5,256	57,376	50%	21%	13%	20%	23%	24%

Panel B: Capital Expenditures Across High and Low Book to Market Firms

Market Feedback Quintile[2]	High Book to Market				Low Book to Market			
	N[3]	Average Bk/Mkt	Mean (Median) CAPEX[4]	% Under-invest	N[3]	Average Bk/Mkt	Mean (Median) CAPEX[4]	% Under-invest
1	18	0.34	-0.54 (0.03)	44	19	0.02	-23.45* (-5.90)	95
2	25	0.29	0.35 (0.18)	36	12	0.02	-4.29* (-2.28)	83
3	19	0.23	0.45 (0.18)	32	18	0.02	-4.12 (-0.31)	67
4	16	0.41	0.58 (0.21)	38	21	0.02	-3.16 (-0.55)	62
5	14	0.19	1.26 (0.33)	14	22	0.02	-2.22 (-1.76)	73

* Significantly different from zero at a 5% level of significance.

Notes
1. The Alternative Investment Market
2. Market feedback is defined as the 4 week excess return.
3. One observation was omitted as an outlier, with scaled excess capital expenditure of 1173.57. This firm has a low market to book ratio. There are 92 IPO firms within each book to market sub-sample (high/low).
4. Scaled abnormal capital expenditure

Table 7
The Impact of Underinvestment on Debt and Dividend Payments

Scaled abnormal debt repayments and dividend payout ratios are compared for under and over investing firms across both market feedback quintiles ((i) Q1 (ii) Q2 to Q5) and investment constraints ((i) high book to market (ii) low book to market).

A *t*-test is employed to test the null hypothesis that the population mean equals zero (debt repayments) or one (dividend relative). Sign and signed rank (Wilcoxon) tests are employed to test the null hypothesis that the population median is zero (debt repayment) or one (dividend relative).

CAPEX	B/M	Feedback	n	Debt Repayment[1] Mean (Median)	Dividend Relative[2] Mean (Median)
Under-invest	High	Q1	8	0.54 (0.14)	1.65 (0.65)
		Q2-5	23	0.36* (0.17**)	1.24 (1.17)
	Low	Q1	18	3.20 (0.18)	0.42* (0.00*)
		Q2-5	50[3]	0.17 (0.19*)	0.88 (0.00)
Over-invest	Low	Q1	1	0.16 (0.16)	1.68 (1.68)
		Q2-5	23	-15.37 (0.00)	1.04 (0.80)
	High	Q1	10	-0.14 (-0.11)	0.75 (0.34)
		Q2-5	51	0.01 (0.01)	1.52** (1.31**)

** Significantly different from zero (one) at a 1% level of significance (* = 5% level of significance)

Notes
1. Scaled abnormal debt repayment
2. Average dividend over 1 and 2 years post the IPO relative to sector average.
3. One observation was omitted as an outlier with a scaled abnormal debt repayment of 3,552.

Table 8
Investment Constraints and Long Run IPO Performance

This table presents long run share price performance by book to market. Low book to market poor feedback firms substantially revised their initial investment plans in accordance with market feedback, whereas high book to market firms did not. Panel A refers to low book to market firms and Panel B refers to high book to market firms. Four long-term return measures are utilised. The first measure is the matched long-term return which compares the observed return on IPO firms to a control firm matched by market capitalisation at the beginning of the first calendar year post-listing. The second measure is the market adjusted long-term return where the return on the market (FTSE All Share index) is subtracted from the observed return on the IPO firm. The third measure is the industry adjusted long-term return where the return on the industrial sector index is subtracted from the observed return on the IPO firm. The fourth measure is the risk adjusted return and utilises the following model:

$$R_{it} = \alpha_i + \beta_1(R_{mt} - r_{ft}) + \beta_2(R_{ht} - r_{ft}) + \varepsilon_{it}$$

where R_{it} is the return on company *i*, R_{mt} is the return on the FTSE All Share index, R_{ht} is the return on the Hoare-Govett Smaller Companies index, and r_{ft} is the return on 90-day UK treasury bills. Two test statistics are employed. The *t*-test compares the difference in means across Quintile 1 and Rest of Sample and the *z*-statistic is from a Mann-Whitney U test that the locations of the two populations ('Quintile 1' and 'Rest of Sample') are equivalent. Four companies were omitted from the long run study owing to a lack of data.

Panel A: Low Book to Market IPOs

	Quintile 1	Rest	*t* stat.	*z* stat
Number of Firms	19	72		
Matched Returns				
12 months	-53.27%	11.80%	-3.157**	-3.164**
24 months	-43.45%	19.39%	-1.817	-1.797
36 months	-0.27%	31.85%	-0.755	-0.742
Market Adjusted Returns				
12 months	-30.53%	-0.00%	-1.936	-2.226*
24 months	1.23%	2.61%	-0.052	-0.283
36 months	44.07%	22.31%	0.655	-0.723
Industry Adjusted Returns				
12 months	-41.89%	-0.32%	-2.589**	-2.539**
24 months	-26.26%	-7.81%	-0.675	-1.074
36 months	4.21%	2.89%	0.041	-0.225
Risk Adjusted Returns				
12 months	-26.47%	10.23%	-2.389*	-2.490**
24 months	1.19%	14.90%	-0.548	-0.869
36 months	42.63%	23.83%	0.626	-0.859

Panel B: High Book to Market IPOs

	Quintile 1	Rest	*t* stat.	*z* stat
Number of Firms	18	72		
Matched Returns				
12 months	-44.08%	16.49%	-3.429**	-3.298**
24 months	-58.79%	22.49%	-2.745**	-2.774**
36 months	-83.46%	23.00%	-3.071**	-3.077**
Market Adjusted Returns				
12 months	-43.92%	6.84%	-3.481**	-3.409**
24 months	-67.32%	9.01%	-3.496**	-3.541**
36 months	-70.40%	16.94%	-3.293**	-3.298**
Industry Adjusted Returns				
12 months	-34.89%	8.22%	-2.932**	-2.774**
24 months	-51.35%	12.03%	-2.782**	-2.834**
36 months	-54.55%	23.86%	-2.852**	-2.885**
Risk Adjusted Returns				
12 months	-32.74%	14.93%	-3.634**	-3.662**
24 months	-49.42%	19.86%	-3.490**	-3.460**
36 months	-53.82%	24.50%	-3.046**	-3.208**

** Significant at 1% and *5% level, employing a two tailed test.

Table 9
Capital Raised Post the IPO

This table presents capital raising for three years post the IPO across low and high book to market firms and across negative (Q1) and positive feedback firms (Q2 to Q5). Capital is defined as the net (of repayments) total amount of equity, debt and preference share capital raised, as a percentage of IPO proceeds. Amounts for each year are cumulative. Firms which do not survive for the full year are omitted from the analysis for that year.

	High B/M	Low B/M	*t*-stat	*z*-stat
Year 1				
Q1 Mean (Median)	0.40 (0.00)	0.58 (0.02)	-0.454	-1.033
Q2 to Q5 Mean (Median)	0.60 (0.09)	0.60 (0.00)	0.007	-0.083
t-stat	-0.586	-0.051		
z-stat	-0.747	-0.689		
Year 2				
Q1 Mean (Median)	0.84 (0.21)	1.17 (0.77)	-0.509	-1.505
Q2 to Q5 Mean (Median)	1.44 (0.57)	1.72 (0.61)	-0.485	-0.091
t-stat	-0.991	-0.564		
z-stat	-1.544	-0.213		
Year 3				
Q1 Mean (Median)	0.65 (0.31)	3.24 (2.09)	-3.370**	-3.153**
Q2 to Q5 Mean (Median)	2.61 (1.15)	3.13 (1.07)	-0.513	-0.443
t-stat	-3.073**	0.066		
z-stat	-2.192*	-1.758		

** Significant at 1% and *5% level, employing a two tailed test.